

## Oribatid Mites from Yachidaira-Moor, Northeast Japan

### (I) Redescription of *Trhypochthoniellus setosus*, with Special Reference to the Ontogenetic Development

Genichi KURIKI<sup>1)</sup> and Jun-ichi AOKI<sup>2)</sup>

栗城 源一<sup>1)</sup>・青木 淳一<sup>2)</sup>: 谷地平湿原のササラダニ類

(I) ヤチモンツキダニ *Trhypochthoniellus setosus*

WILLMANN の再記載と後胚子発生

**Abstract:** *Trhypochthoniellus setosus* WILLMANN was found from some moors in northeast Japan. It is reported for the first time from our country and a redescription is made on the Japanese material. Morphological changes during ontogenetic development are examined especially on notogastral setae, anogenital region, epimeral region and claws.

A great number of specimens of *Trhypochthoniellus setosus* WILLMANN were collected at Yachidaira-moor located in Inawashiro of Fukushima Prefecture, Northeast Japan. The moor is surrounded by *Abies mariesii*-forest and is composed of *Sphagnum* and *Moliniopsis japonica*, where one of the authors, KURIKI, has continued an ecological research on oribatid fauna for fifteen years. The oribatid fauna of the moor is characterized by high density and poor species composition.

As the first report of this series of works on moor oribatid mites, a redescription of *Trhypochthoniellus setosus* WILLMANN, the most dominant oribatid species in the area, is given with special reference to the ontogenetic development.

#### I. Redescription of Adult

##### *Trhypochthoniellus setosus* WILLMANN

(Figs. 1-2)

*Trhypochthonius* (*Trhypochthoniellus*) *setosus* WILLMANN, 1928, p. 3, fig. 3.

*Trhypochthoniellus setosus*: WILLMANN, 1931, p. 104, fig. 38; BALOGH and MAHUNKA, 1983, p. 197.

---

1) Department of Biology, Ohu University, Misumido, Koriyama, 963 Japan

奥羽大学生物学教室

2) Institute of Environmental Science and Technology, Yokohama National University, Tokiwadai, Hodogaya-ku, Yokohama, 240 Japan

横浜国立大学 環境科学研究センター

*Prodorsum*: Rostral seta inserted on a small apophysis; sometimes an irregular transverse ridge found between rostral setae. Lamellar seta longer than rostral seta and shorter than interlamellar seta; their relative length,  $ro:le:in=1:2:3.5$ . Exobothridial seta (*ex*) very short. A faint transverse ridge connecting insertions of lamellar setae.

*Dorsal side of hysterosoma*: The lateral margin from oil gland opening to a short distance behind humeral part on each side slightly protruding as a very narrow plate-like expansion. Another small expansion found on the posterior end of body. Surface of dorsal side wholly covered by reticulate pattern except on lateral and posterior expansions. Seta  $c_1$  inserted just behind interlamellar seta. Ratio of mutual distance  $d_2-d_2$  to  $d_1-d_1$  2.15 on an average (2.01-2.34). Seta  $h_2$  widely separated from each other, being closer to  $h_3$  in dorsal view.

*Ventral side*: Lateral expansion mentioned above has a long posterior extension on the ventral side; the edge of the expansion visible as a distinct curved ridge on each side. Genital plate usually with 11 setae, sometimes 12 or 13. One anal and 2 adanal setae. Setal formula of epimerata: 3-1-3-2. Epimeral setae except *3a*, *3b*, *3c* and *4a* being extremely short and hardly visible.

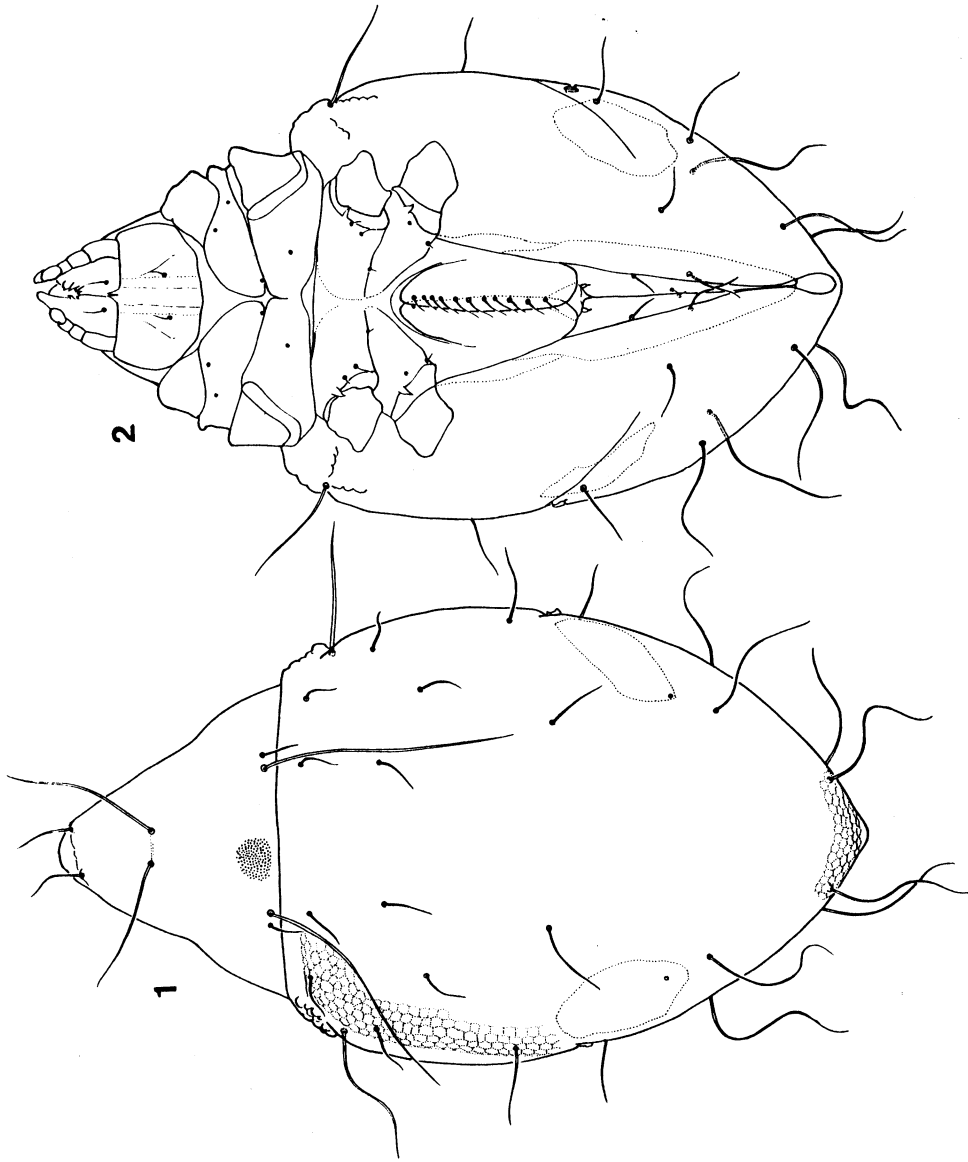
The Japanese specimens are rather similar to *T. setosus canadensis* HAMMER, 1952,

**Table 1** Comparision among some characters of *Trhypochthoniellus setosus* from Europe, Japan and Canada.

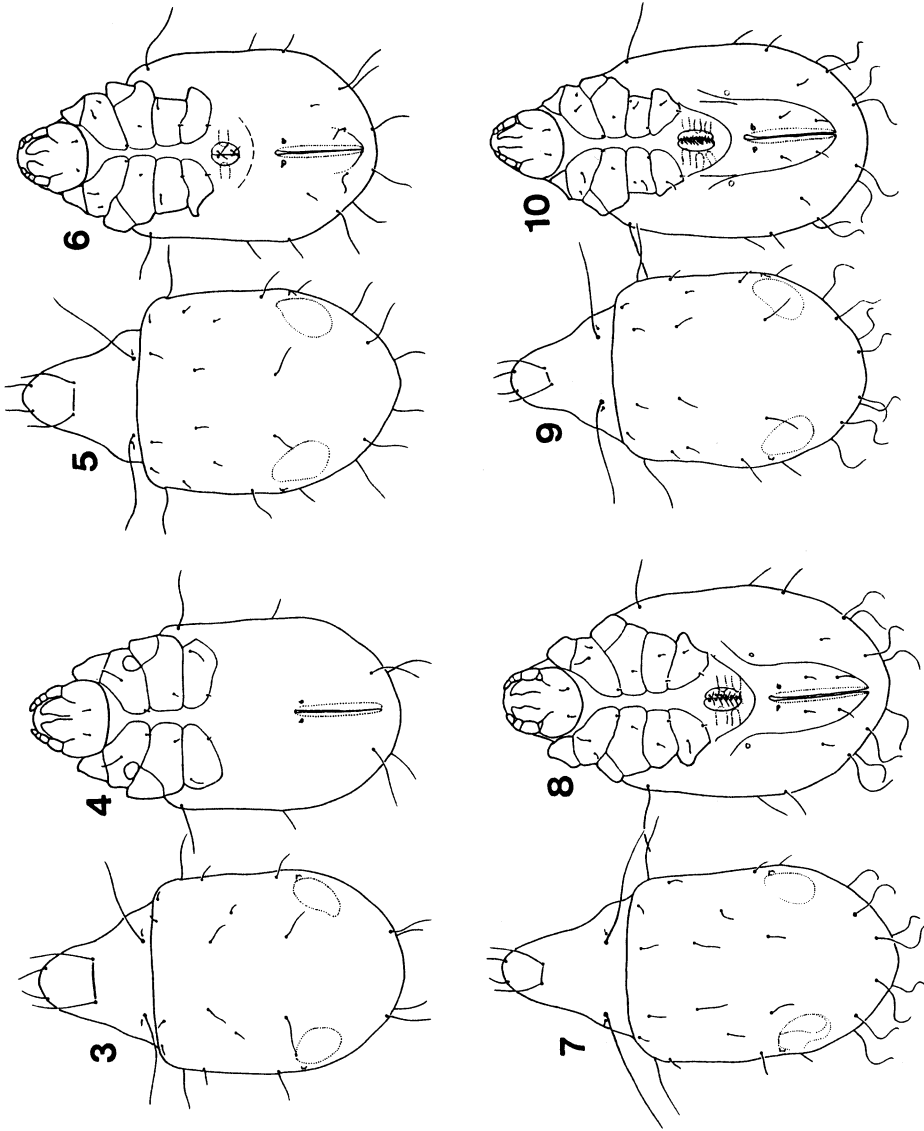
Character	Locality	Germany ( <i>T. setosus setosus</i> )	Japan ( <i>T. setosus</i> )	Canada ( <i>T. setosus canadensis</i> )
Body length ( $\mu\text{m}$ )		490	520-580	520-570
Ratio $d_2-d_2/d_1-d_1$		1.5	2.15	2.5
Cistances $e_1-e_1$ and $e_2-e_2$		$e_1-e_1 > e_1-e_2$	$e_1-e_1 \gg e_1-e_2$	$e_1-e_1 < e_1-e_2$
Dorsal seta $h_3$		very close to $h_3$	close to $h_3$	remote from $h_3$

**Table 2** Change in some characters of *T. setosus* during ontogenetic development.

Character	Stage	Larva	Protonymph	Deutonymph	Tritonymph	Adult
Body length ( $\mu\text{m}$ )		265-290	320-350	390-410	460-500	520-580
Number of claws		1	1	1	1	3
Number of notogastral setae (pairs)		10	13	13	13	13
Number of genital setae (pairs)		—	2	6-8	10, 11	11-13
Number of genital suckers (pairs)		—	1	2	3	3
Number of aggenital setae (pairs)		0	0	0	0	0
Number of anal setae (pairs)		0	0	0	0	1
Number of adanal setae (pairs)		0	0	2	2	2
Setal formula of epimerata		2-1-2	3-1-2-1	3-1-2-2	3-1-3-2	3-1-3-2



Figs. 1-2 *Trhypochthoniellus setosus* WILLMANN. Adult. 1: Dorsal. 2: Ventral.



Figs. 3-10 *Trhypochthoniellus setosus* WILLMANN. 3-4: Larva. 5-6: Protonymph. 7-8: Deutonymph. 9-10: Tritonymph.

in the ratio of mutual distance  $d_2-d_2$  to that of  $d_1-d_1$ , but they are more similar to *T. setosus setosus* WILLMANN, 1928, in the position of  $e_1$  as well as  $h_2$ , which are located closer to lateral margin. At the present moment, the authors prefer not to give them a subspecific name.

*Collecting data*: 500 exs. Yachidaira Moor in Inawashiro, Fukushima-ken, 23-VII-1974. G. KURIKI.—122 exs. Ozegahara Moor in Oze, Fukushima-ken, 9-VIII-1973. G. KURIKI.—102 exs. Mt. Aizu-Tashiro in Tateiwa-mura, Fukushima-ken, 20-VII-1984. G. KURIKI.—250 exs. Numanohara Moor of Mt. Taisetu, Hokkaido, 24-VII-1983. G. KURIKI.

*Distribution*: Europe, USSR, N. America and Japan.

## 2. Ontogenetic Development

(Figs. 3-10)

The profile of immature stages well resembles that of adult, but sclerotization of hysterosoma is poorly developed. The morphological features common to all stages are as follows: Four pairs of prodorsal setae smooth; their relative lengths,  $ro:le:in=1:2:3.5$ . Seta  $ex$  short. Trichobothridia are absent. A faint transverse ridge found between lamellar setae. The whole surface of prodorsum minutely punctured and notogaster with reticulate pattern. Oil gland situated lateroabdominally and the opening found behind seta  $e_2$ . All notogastral setae simple.

Morphological transition during ontogenetic development is described below:

Body size (in  $\mu\text{m}$ ): Body length $\times$ width, larvae 265(280)290 $\times$ 135(145)155, protonymphs 320(335)350 $\times$ 145(160)180, deutonymphs 390(400)410 $\times$ 210(230)260, tritonymphs 460(480)500 $\times$ 240(260)280, adults 520(550)580 $\times$ 320(330)340. Their relative lengths among the stages, 1: 1.2: 1.4: 1.7: 2.0.

*Color*: Light brown in immature stages with weak sclerotization found on prodorsum and legs. But wholly reddish brown in adults.

*Prodorsum*. Prodorsum with 4 pairs of simple setiform setae. So far as take a dorsal view, no morphological transition can be recognized.

*Notogaster*: Ten pairs of notogastral setae simple setiform in larval stage:  $c_1$ ,  $c_2$ ,  $c_3$ ,  $cp$ ,  $d_1$ ,  $d_2$ ,  $e_1$ ,  $e_2$ ,  $h_1$  and  $h_2$ . Setae  $c_3$ ,  $h_1$  and  $h_2$  long. Relative lengths of setae:  $h_1>e_1>d_1=c_1$ . Seta  $h_2$  located closer to the lateroposterior edge of anal region. Setae  $f_2$ ,  $h_3$ ,  $ps_1$  and  $ps_2$  added in protonymphal stage. Setae  $h_2$  and  $h_3$  located lateroposteriorly near the margin of body. Short setae  $ps_1$  and  $ps_2$  closer to anal region, moving more aside and being elongated as the development progresses. Four pairs of long setae,  $h_1$ ,  $h_2$ ,  $h_3$  and  $ps_1$ , located near the posterior margin of body, strongly curled in deutonymphal, tritonymphal and adult stages.

*Anogenital region*: The transition of anal aperture in length is as follows (in  $\mu\text{m}$ , in average): Larva 75, protonymph 80, deutonymph 105, tritonymph 125, adult 155.

Two pairs of adanal setae appeared in deutonymphal stage, which are similar to each other in length. A pair of short anal setae appeared in adult stage. Adanal fissures situated close to the lateroanterior edge of anal aperture in all stages. Genital plate appeared in protonymphal stage. The transition of genital aperture in length is as follows (in  $\mu\text{m}$ , in average): Protonymph 27.5, deutonymph 40, tritonymph 60, adult 130. The size of genital aperture is suddenly increased in adult stage. Anal and genital regions well separated in immature stages (brachypyline type), but adjacent to each other in adult stage (macrophyline type). The number of pairs of genital setae are as follows: Protonymph 2, deutonymph 6-8, tritonymph 10 or 11, adult 11-13. These setae simple and relatively long, arranged along median margins of genital plates. Adgenital setae absent in all stages. Genital suckers cap-like.

*Epimeral region*: Claparède's organ situated on epimera II (Fig. 4). Epimerata I, II, III and IV close to each other. The transition of setal formulae of epimerata as follows: Larva 2-1-1, protonymph 3-1-2-1, deutonymph 3-1-2-2, tritonymph 3-1-3-2, adult 3-1-3-2. Epimeral setae relatively long in young stages, but some of them short and hardly visible in tritonymphal and adult stages.

*Legs*: All the legs monodactyle in immature stages and tridactyle in adult stage, the median claw on each leg being shorter than the laterals.

## 摘 要

福島県猪苗代町谷地平湿原から得られたササラダニ類のヤチモンツキダニ属(新称) *Trhypochthoniellus* の一種を日本新記録種ヤチモンツキダニ(新称) *Trhypochthoniellus setosus* WILLMANN, 1928 として再記載した。さらに、後胚子発生にともなう形態変化を調べた結果、幼虫、第1若虫、第2若虫、第3若虫、成虫へと成長するにしたがい、後体部毛は 10, 13, 13, 13, 13対、基節板毛式は 2-1-2, 3-1-2-1, 3-1-2-2, 3-1-3-2, 3-1-3-2, 生殖門毛は 0, 2, 6-8, 10-11, 11-13対、肛毛は 0, 0, 0, 0, 1対、肛側毛は 0, 0, 2, 2, 2対、各脚の爪数は 1, 1, 1, 1, 3のごとく、毛数や爪数を増加させていくことがわかった。

## References

- BALOGH, J. and S. MAHUNKA, 1983. The Soil Mites of the World. I. Primitive Oribatids of the Palaearctic Region. 372 pp. Akadémiai Kiadó, Budapest.
- HAMMER, M., 1952. Investigations on the microfauna of northern Canada. Part I. Oribatidae. *Acta Arct.*, København, 4: 1-108.
- WILLMANN, C., 1928. Neue Oribatiden. I. *Zool. Anz.*, 76(1-2): 1-5.
- 1931. Die Tierwelt Deutschlands. 22 Teil. Spinnentiere order Arachnoidea. V: Acari-Oribatei. 200 pp. Gustav Fischer, Jena.